

Station #6: Nitrates
Work Sheet**Background**

Nitrogen is one of the three major nutrients needed by plants. Most plants cannot use nitrogen in its molecular form (N_2). In aquatic ecosystems, blue-green algae are able to convert N_2 into ammonia (NH_3) and nitrate (NO_3^-), which can then be used by plants. Animals eat these plants to obtain nitrogen they need to form proteins. When plants and animals die, bacteria break down protein molecules into ammonia. Other bacteria then oxidize the ammonia into nitrites (NO_2^-) and nitrates (NO_3^-). Under suboxic conditions nitrates can then be transformed by other bacteria into ammonia (NH_3), beginning the nitrogen cycle again.

Typically nitrogen levels in natural waters are low (below 1ppm nitrate nitrogen). Nitrogen released by dead plants and animals and decomposing animal excretions is rapidly consumed by plants. In water bodies with high nitrogen levels eutrophication can occur. Nitrogen levels can become elevated from natural or human-related activities. Ducks and geese contribute heavily to nitrogen in the water where they are found. Man made sources of nitrogen include sewage dumped into rivers, fertilizer washed into streams or leached into groundwater, and runoff from feedlots and barnyards.

Nitrate levels are measured in milligrams per liter nitrate nitrogen.

Procedure

- Following the steps in the *Nitrate Procedure*, measure the nitrate level of the water sample. Compare the readings of several students. Are they within 0.2mg/L of each other? If not, discuss possible reasons for error. Repeat the readings until you obtain readings with 0.2mg/L.
- Repeat the procedure with the same water, but shake the sample for half of the time given in the procedure.
- Repeat the procedure with the same water, but let the sample set for five minutes beyond the time given in the procedure.
- Measure the nitrate level in a number of different water samples: runoff from a golf course, other pond water, a stock tank, river, cave pond, etc. List the sources of water and record your results as per example below.
- Add a few grains of any fertilizer to your sample. Test again. What is the difference?
- Discuss possible sources of nitrogen in your water samples.

Sample Tested	Reading	Student